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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/725,756	11/30/2000	Hideyo Makino	199892US2	1614

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EXAMINER

PHAM, HAI CHI

ART UNIT	PAPER NUMBER
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2861

DATE MAILED: 06/30/2003

16

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/725,756

Applicant(s)

MAKINO, HIDEYO

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,6,8,22,26,28 and 41-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,6,8,22,26,28 and 41-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

FINAL REJECTION

Specification

1. The disclosure is objected to because of the following informalities:

- Page 25, line 5, "6B" should read --5B--.

Appropriate correction is required. Applicant's cooperation in reviewing the specification and subsequently correcting any other typographical errors is greatly appreciated.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6, 8, 26, 28, 42, 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6:

- The following limitation "means for collimating said laser beams emitted by said plurality semiconductor arrays" appears to be misleading in that only one collimator lens is claimed to collimate the laser beams emitted by said plurality semiconductor arrays together. Such claimed limitation is not supported by the specification (see specification, page 25, lines 2-5).

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Claim 26:

- Similarly, the following limitation "a collimator lens configured to collimate said laser beams emitted by said plurality semiconductor arrays" appears to be misleading in that only one collimator lens is claimed to collimate the laser beams emitted by said plurality semiconductor arrays together. Such claimed limitation is not supported by the specification (see specification, page 25, lines 2-5).

Claims 8, 28, 42, 44 are dependent from claims 6 and 26 above, and are therefore indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 22, 41, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (U.S. 6,268,877 B1) in view of Nakajima et al. (U.S. 5,999,345) and Iwasa et al. (U.S. 6,144,685).

Sato et al. discloses a scanning optical device comprising a semiconductor laser array (multibeam laser source 1) including a plurality of light emitting points in a single package (the multibeam laser source 1 having a plurality of light-emitting points formed

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on a single substrate surface), said plurality of light emitting points being formed to be positioned in linear relationship to one another so as to respectively emit laser beams simultaneously scanned over a recording substrate (photosensitive member 7), an adjusting means for adjusting a position of said plural semiconductor laser array so as to form a tilted angle (inclination angle θ) (Fig. 4), which is based on both the interval between the light emitting points and the dot density (recording density pitch P) in the sub-scanning direction, and a collimator lens (2) for collimating the laser beams emitted by the semiconductor laser array. Sato et al. further teaches the adjusting means rotating each of the semiconductor laser arrays around a midpoint (M) of a line connecting the centers of the light emitting points, and around the optical axis of the collimator lens (col. 4, lines 11-30).

Sato et al. teaches the semiconductor laser array having a plurality of light-emitting points but represented by only shows two light-emitting points, and thus does not explicitly disclose the semiconductor array having four light-emitting points positioned at an equidistant pitch.

However, it is well known in the printing art that higher number of light emitting points are commonly used to scan the surface of the photosensitive member as evidenced by Nakajima et al., which discloses a multiple beam scanning apparatus comprising a plurality of semiconductor laser arrays as light sources (LD1, LD2, Fig. 6), each including two or four light emitting points (Figs. 5 and 13, respectively) positioned in linear relationship to one another and having an equidistant pitch so as to respectively emit laser beams simultaneously scanned over a recording substrate

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(photosensitive drum 407). Nakajima et al. further teaches the provision of an adjusting means for rotating each of the semiconductor laser arrays around a midpoint of a line connecting the centers of the light emitting points (around the rotational center C, Fig. 7).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a semiconductor array having more than two light-emitting points as taught by Nakajima et al. in the device of Sato et al. The motivation for doing so would have been to provide a higher speed to the printing device where a plurality of scanning lines can be formed simultaneously.

Sato et al. also does not expressly teach the claimed relationship:

$$\theta \leq \tan^{-1} \{1/(n-1)\}.$$

Regardless, Iwasa et al. discloses a multibeam recording apparatus in which the laser source array is arranged such that the laser beam spots on the surface of the recording medium are aligned (inclined line M', Fig. 7A) in the sub-scanning direction, and are inclined with respect to the main scanning direction (base line N') to form an angle θ' with the main scanning line. The disposition of the laser beam spots on the recording medium as well as the angle θ' are image of the corresponding structure of the laser source array, and result from a predetermined magnification. Table 2 (col. 11) shows the parameters of the multibeam recording apparatus in its basic configuration, where:

$m = 30$ (m is the number of laser beam spots in the sub-scanning direction)

$$\theta = \theta' = 88.1^\circ$$

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The angle formed by the line drawn perpendicular to the primary (main) scanning direction and the line drawn through respective centers of the first to the m-th laser beam spots becomes:

$$90^\circ - \theta' = 90^\circ - 88.1^\circ = 1.8^\circ$$

and the value of

$$\tan^{-1} \{1/(m-1)\} = \tan^{-1} \{1/(30-1)\} = 1.97^\circ$$

Therefore,

$$90^\circ - \theta' \leq \tan^{-1} \{1/(m-1)\}$$

which amply satisfies the claimed inequality.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Sato et al. with the aforementioned teachings of Iwasa et al. for the purpose of adjusting the pitch of the scanning lines.

6. Claims 6, 8, 26, 28, 42, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima (JP 9-236763) in view of Nakajima et al. (U.S. 5,999,345) and Iwasa et al.

Nakajima ('763) discloses a multibeam scanning device having a plurality of semiconductor laser arrays (10, 11) with corresponding collimator lenses (12, 13), and an adjusting means rotating each of the semiconductor laser arrays around a midpoint (M) of a line connecting the centers of the light emitting points, and around the optical axis of the collimator lens (12) (see Figs. 2 and 4).

However, Nakajima et al. ('763) does not explicitly disclose the semiconductor array having four light-emitting points positioned at an equidistant pitch.

Nevertheless, it is well known in the printing art that higher number of light emitting points are commonly used to scan the surface of the photosensitive member as evidenced by Nakajima et al. ('345), which discloses a multiple beam scanning apparatus comprising a plurality of semiconductor laser arrays as light sources (LD1, LD2, Fig. 6), each including two or four light emitting points (Figs. 5 and 13, respectively) positioned in linear relationship to one another and having an equidistant pitch so as to respectively emit laser beams simultaneously scanned over a recording substrate (photosensitive drum 407). Nakajima et al. ('345) further teaches the provision of an adjusting means for rotating each of the semiconductor laser arrays around a midpoint of a line connecting the centers of the light emitting points (around the rotational-center C, Fig. 7).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a semiconductor array having more than two light-emitting points as taught by Nakajima et al. ('345) in the device of Nakajima et al. ('763). The motivation for doing so would have been to provide a higher speed to the printing device where a plurality of scanning lines can be formed simultaneously.

Nakajima et al. ('763) also does not expressly teach the claimed relationship:

$$\theta \leq \tan^{-1} \{1/(n-1)\}.$$

Regardless, Iwasa et al. discloses a multibeam recording apparatus in which the laser source array is arranged such that the laser beam spots on the surface of the

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recording medium are aligned (inclined line M', Fig. 7A) in the sub-scanning direction, and are inclined with respect to the main scanning direction (base line N') to form an angle θ' with the main scanning line. The disposition of the laser beam spots on the recording medium as well as the angle θ' are image of the corresponding structure of the laser source array, and result from a predetermined magnification. Table 2 (col. 11) shows the parameters of the multibeam recording apparatus in its basic configuration, where:

$$m = 30 \quad (m \text{ is the number of laser beam spots in the sub-scanning direction})$$

$$\theta = \theta' = 88.1^\circ$$

The angle formed by the line drawn perpendicular to the primary (main) scanning direction and the line drawn through respective centers of the first to the m-th laser beam spots becomes:

$$90^\circ - \theta' = 90^\circ - 88.1^\circ = 1.8^\circ$$

and the value of

$$\tan^{-1} \{1/(m-1)\} = \tan^{-1} \{1/(30-1)\} = 1.97^\circ$$

Therefore,

$$90^\circ - \theta' \leq \tan^{-1} \{1/(m-1)\}$$

which amply satisfies the claimed inequality.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Nakajima et al. ('763) with the aforementioned teachings of Iwasa et al. for the purpose of adjusting the pitch of the scanning lines.

Response to Arguments

7. Applicant's arguments with respect to claims 2, 6, 8, 22, 26, 28, 41-44 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

Conclusion

8. Applicant's amendment, which changes the scope of each of the base claims, necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



HAI PHAM
PRIMARY EXAMINER

June 25, 2003